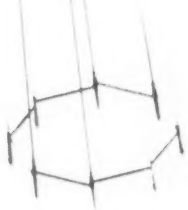
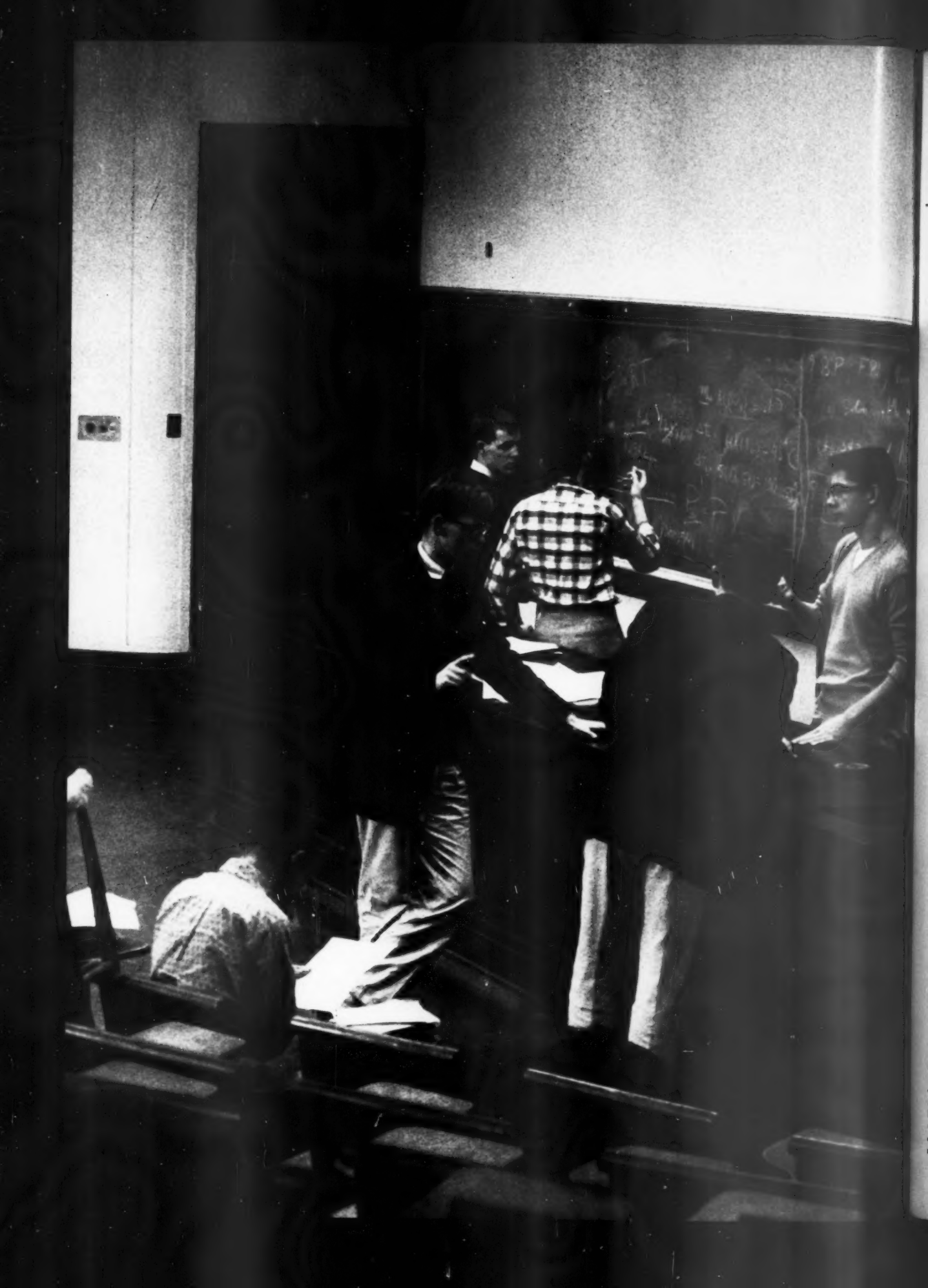
MARCH 1960 · 35c

The Johns Hopkins Magazine

FROM A BALLOON: A NEW LOOK AT VENUS





The Johns Hopkins Magazine

◀ At a university, education is more than the teacher talking and the student listening. It is also the free and exciting exchange of ideas among intellectually curious people seeking answers. Here students confer in Remsen Hall before their class. Photograph by M. E. Warren.

March, 1960 *Volume XI Number 6*

A NEW LOOK AT VENUS 4
Using an ingenious telescope-spectroscope designed by a Hopkins astrophysicist, balloon-borne scientists found water vapor on Venus.

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Though a victim of crippling multiple sclerosis for thirty-three years, Madelaine Ray Brown has led a busy and productive life.

CAMBRIDGE UNIVERSITY 14
It survived centuries of political and religious conflict to become one of the world's greatest institutions of higher learning.

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COMING EVENTS AT JOHNS HOPKINS Cover III

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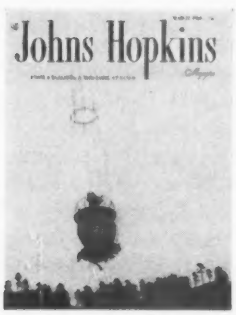

The Cover:

On a cold morning last November, a balloon soared to 80,000 feet to give Man a new look at Venus. The unique project, directed by a Hopkins astrophysicist, provided evidence of water vapor in the atmosphere of Venus. U.S. Navy photograph

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EDITOR'S NOTES

IN THE ARTICLE, "A New Look at Venus," which begins on page four, Lynn Poole effectively dispels the common notion that astronomy is a rather sedentary enterprise, pursued by quiet old men in lonely observatories "looking at stars." This story of a balloon ascent to study the atmosphere of Venus is rich with excitement: feverish activity, last-minute setbacks, tensions, near disasters, and at the last, a major scientific triumph.

Mr. Poole's article recalled to our minds a story which also demonstrates the point about astronomy being a dramatic business—perhaps even more effectively, for this story has a very sad ending. It concerns Venus, too, but significantly, it dates from before the "Space Age" and before the advent of modern astrophysics.

In 1760, a French astronomer named Guillaume Legentil made preparations to observe Venus during a transit—the occasion when the planet passes directly between the sun and the earth. Because the orbit of Venus is "slanted" (in relation to the orbit of the earth), these transits do not occur often; they appear in pairs, eight years apart, and then not again for over a century.

Knowing that the transit of 1761 (the first since 1631) would be favorably visible from India, Legentil set out for there the previous year. Unfortunately, the Seven Years' War disrupted his journey, and Legentil arrived in India after the transit was over. Rather than risk a second delay, he decided to wait in India through the next eight years for the transit of 1769, when Venus would line up with the sun and the earth on June 3. June 2 was a bright, clear day, and so—as it turned out—was the fourth, but June 3 itself was hopelessly clouded over, and Legentil saw nothing. Since it was rather unfeasible to wait for the next transit (that of 1874), he packed up and set off for Paris. Twice he was shipwrecked, but eventually he reached home after an absence of eleven years—to find that he had been presumed dead, and his property divided among his heirs.

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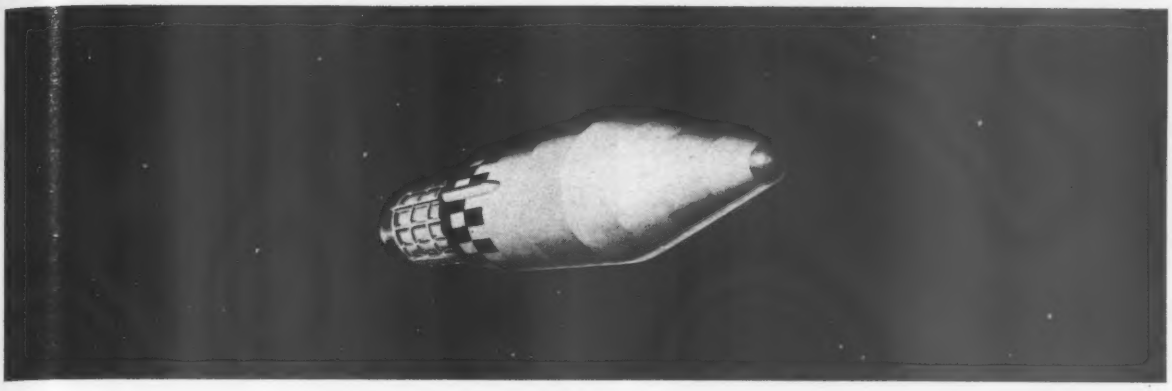

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VERNE MUFFOLETTO

JOHN MC CLELLAN

They worked . . .

JOHN STRONG

they waited . . .

The Historic Balloon Ascent into the Stratosphere

A NEW LOOK

MAN HAS ALWAYS been fascinated by the geography of the universe. As astronomy has developed more powerful and precise telescopes, scientists have been able to probe farther and farther beyond the limits of the earth's native galaxy into worlds billions of light-years away.

But now that man is at the threshold of the "Space Age," increasing attention is being given to celestial bodies closer to home, and especially to the earth's nearest neighbors: the moon, Venus, and Mars. Of the three, Venus is in many ways the most tantalizing to the imagination, and also the one about which least is known. Except for the moon, it is the brightest planet in the sky, the nearest to the earth, and the one most like it in size and weight.

The orbital path of Venus has been closely studied, and the length of its year is known to be 225 days. But most of the facts about the nature of Venus are enshrouded in mystery, for the planet itself is enveloped in a dense, murky atmosphere. What is the surface like? Is it wet? Dry? Cold? Warm? Is it still and lifeless like the moon, or abundant with vegetation and other forms of life? No one has seen through the cloud layer of Venus. (Even the length of a day on Venus remains a mystery, for without a fixed visible point of reference on the planet's surface, it is hardly possible to determine the period of rotation on its axis.)

One of the keys to the mystery of Venus is knowledge about its atmosphere; if more were known about the composition of the thick blanket that surrounds Venus, a number of important facts about the planet's surface might be established by inference.

To the disappointment of romantically imaginative laymen who are anxious to find Venus inhabited or at least a habitable planet, science proceeds in slow, cautious, non-committal steps. There have been many barriers to fruitful studies of the atmosphere of Venus, and, for a long time, most of them seemed insurmountable. Then, four months ago, science achieved a major breakthrough in the exploration of earth's sister planet. As a "Space Age" feat, amid the circus of powerful rockets and beeping satellites, the achievement brought little popular applause; but certainly the event stands as one of the most dramatic in the annals of astrophysics.

Beginning on the next page, Lynn Poole, director of public relations for the Johns Hopkins University, tells the story of that significant event. An eye-witness to the first stages of the project, Mr. Poole is also something of an armchair "stratonaut"; he has written a book on ballooning, called *Ballooning in the Space Age.* —THE EDITORS

JOHN ST

. . .

JOHN STRONG

JOHN STRONG

JOHN STRONG

they watched . . .

OK AT VENUS

THROUGHOUT the sub-zero night of Saturday, November 27–28, 1959, a group of scientists worked on the snow-covered, five-acre floor of the Stratobowl, a five-hundred-foot natural depression in the Black Hills of South Dakota. They were preparing a manned balloon flight into the stratosphere for a new look at Venus.

Muffled voices contrasted with the snap of boots on frozen snow. Brilliant flood lights created an eerie pattern on a white spherical gondola and on long tanks of helium inertly waiting to fill a giant plastic balloon.

Weather reports were encouraging for a morning launch of the Stratolab balloon, whose pressurized gondola had been adapted to carry a special telescope 80,000 feet above the earth. As the pre-launch count down continued, men crossed numbed fingers for luck. They had suffered disappointments and near-tragedy too many times to be overly optimistic.

Among the crowd of technicians and scientists stood the man who had conceived the unique project, Dr. John Strong, director of the Johns Hopkins Laboratory of Astrophysics and Physical Meteorology. Calmly he directed the checks and rechecks on the telescope-spectroscope system he had created to answer the centuries-old question of whether the atmosphere around Venus contains water vapor.

A NEW LOOK AT VENUS
Continued

Charles B. Moore, scientific observer during the ascent, checks the telescope. Venus was too low in the sky to observe during the afternoon of the first day.

U. S. NAVY

Through the long night, the two men wait for Venus to reappear at 3:30 a.m. Huddled beneath a protective parka, Commander Ross fights the bitter cold.

As the sun rose over the rim of the Stratobowl, weather reports were consistently favorable. Activity increased, but optimism was still held in check.

In a nearby shack Navy Commander Malcolm D. Ross, physicist and record-breaking balloonist, and Dr. Charles D. Moore, physicist-meteorologist, were preparing for the ascent. Skilled hands assisted the two "stratonauts" into partial-pressure suits which would protect them in case they had to bail out in that rarified region where 98 per cent of the earth's atmosphere was beneath them.

Outside, the officer in charge of launch gave the word to "make ready." A huge covered package was delicately opened, and the balloon inside was carefully uncoiled. Within minutes, the two-hundred-foot balloon, made of two-thousandths-of-an-inch thin polyethylene was stretched across the Stratobowl floor. Final adjustments were made on the complex equipment inside and outside the gondola. Dr. Strong's assistants removed the protective plastic cover from the telescope and made final rechecks.

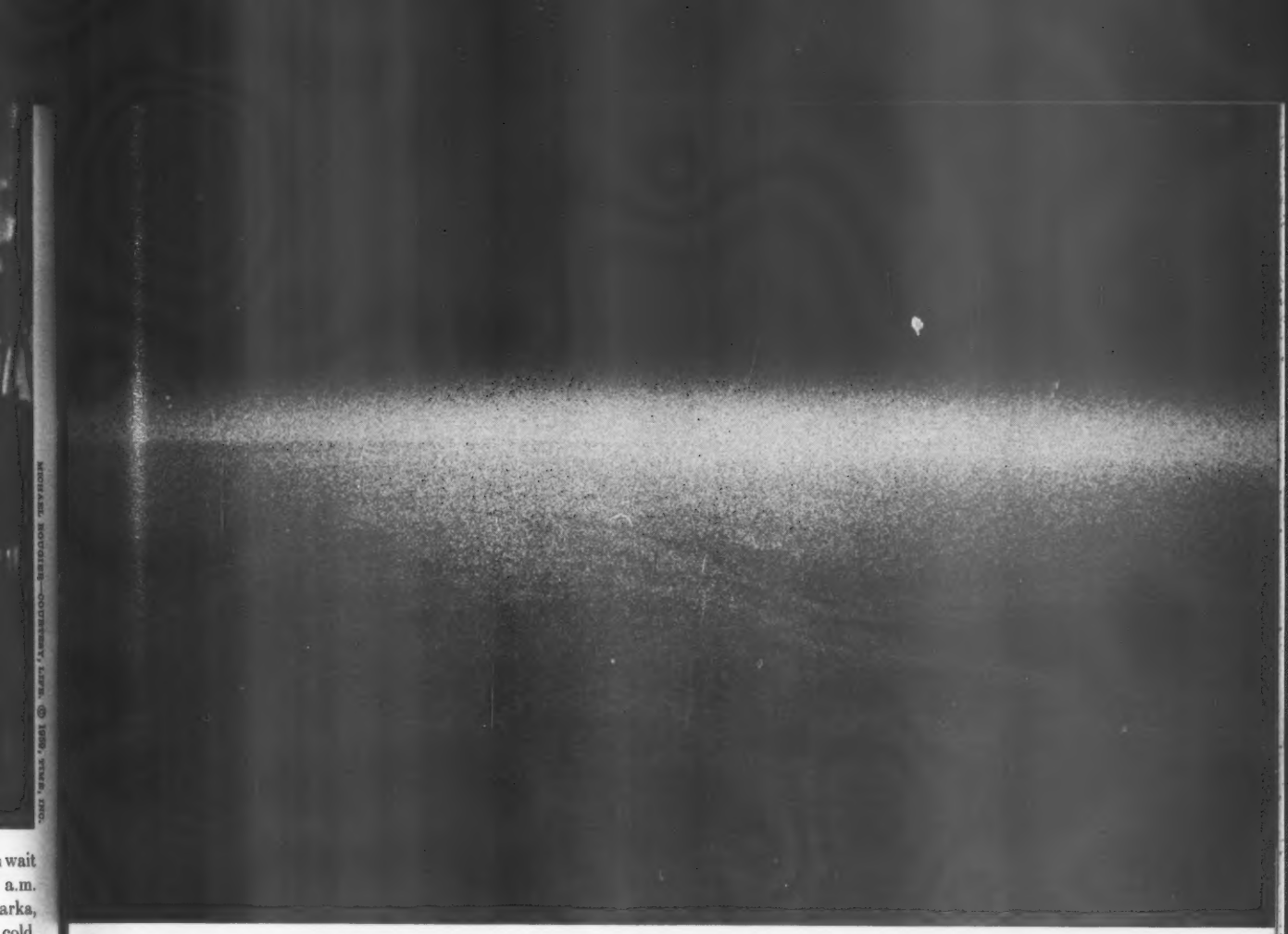
A team of specialists inserted a tube into a sleeve-guard on the lower end of the balloon, and helium swiftly hissed through it to inflate the great bag. The long, thin streak of polyethylene began to expand and pulsate. Men grasped tie-down ropes as the balloon inched off the floor of the Stratobowl and slowly rose until it finally floated perpendicularly to the ground.

After technical delays, Commander Ross and Dr. Moore climbed through the three-foot hatch, into the seven-foot-wide gondola and took their seats on either side of a metal tube which encased spectroscopic apparatus and led up to the sixteen-inch reflecting telescope mounted atop the gondola.

Suddenly, Dr. Moore sniffed the air and saw smoke. A small electric motor had short-circuited; an hour-and-a-half later it had been repaired. Last words were spoken and the hatch sealed. Then a gust of wind arose, turned the balloon, and swirled and twisted the ropes holding the balloon to the gondola. Grasping tie-down ropes, men did a Maypole walk around the balloon, untwisting it—while someone relieved the tension by a harmonica rendition of "Here We Go 'Round the Mulberry Bush."

Now the balloon was untwisted. It tugged at its restraining ties. Launch ropes were slacked off, then played out, and, at 10:16 a.m., the two-million-cubic-foot balloon floated free and lifted the four-thousand-pound gondola from the launch pad.

Standing on the floor of the Stratobowl, Dr. Strong,



Over Nebraska, at 79,000 feet, the gondola affords a majestic view of the earth. Even at 3 p.m., the space above is pitch black.

his pipe clenched between his teeth, watched the balloon rise rapidly and drift perilously close to the rocky rim. The gondola cleared the rim, and, under Commander Ross's skilled control, headed for the objective—the first manned astronomical platform to be established above the earth's atmosphere.

THIS DRAMATIC ASCENT was the culmination of three years of glamorless hard work by Dr. Strong, his Hopkins associates, and the many others who helped design, plan, and prepare for this Stratolab experiment.

The preliminary work, however, started much earlier. In 1949, the Office of Naval Research began a program designed to send both manned and unmanned balloons into the stratosphere in pursuit of answers to many scientific questions. Dr. Moore, an expert balloonist, found apt pupils in Commander Ross and the late M. Lee Lewis. After winning their balloon pilot's licenses, Ross and Lewis, dressed in heavy clothing and wearing oxygen masks, climbed into a small, open-air, washbasket-type gondola and floated up to 40,000 feet. There they studied their own physical reactions and the properties of contrails—the long, white streaks of condensed air left by a jet plane. Later, in another open gondola, Moore and Ross ascended to study cumulonimbus clouds at close range. In 1956, using a spherical, sealed, pressurized gondola which they had rebuilt, Ross and Moore made an ascent to a record 76,000 feet. A year later, they broke their own record by reaching 86,000 feet.

Dr. Strong was aware of the success of these stratospheric pioneers and recognized in the balloon a possible solution to at least one problem which had frustrated astrophysicists.

The study of celestial bodies had always been hampered by the presence of the gaseous, murky atmosphere surrounding the earth. The problem is somewhat like lying on the bed of a muddy river and peering up through the dirty water at the sky above. Even with the most powerful telescopes and delicate instruments, no one has been able to make precise calculations on how the chemicals in the earth's atmosphere affect the recording of light being emitted from an astral body. Were it possible to get above 98 per cent of the earth's atmosphere, Dr. Strong reasoned, scientists would be able to secure information about neighboring planets that had been impossible to obtain even with Mt. Palomar's two-hundred-inch telescope.

Continued on page 22

In 1927, Madelaine Ray Brown received her M.D. from Johns Hopkins and began her internship at the University of Michigan Hospital. That same year, she suffered her first attack of multiple sclerosis.

℞ *Determination*

Though almost totally crippled, Dr. Brown still does her best

Photographs by Charles Harbutt

SHORTLY BEFORE she received her M.D. from Johns Hopkins in 1927, Madelaine Ray Brown saw a bulletin board card announcing an internship in neurology at Bellevue Hospital. She applied, was accepted, and after serving a rotating internship at the University of Michigan Hospital, began her career at Bellevue Hospital as a neurologist.

At the end of her year at Michigan, however, Dr. Brown suddenly lost the sight of her right eye. After six weeks, before the malady had been diagnosed, she regained her sight. She was relieved, but puzzled. She had no way of knowing that this had been her first contact with an insidious and crippling disease (later to be called multiple sclerosis) of the central nervous system.

Since Dr. Brown's first attack thirty-three years ago, medical scientists have learned much about multiple sclerosis, but its cause and cure remain mysteries. They know that it causes deterioration of the fatty sheath (myelin) which covers and protects the nerve fibers in the brain and spinal column. This disintegration obstructs nerve impulses, causing paralysis or impaired use of the parts of the body innervated by these nerves. Curiously, multiple sclerosis strikes two-thirds of its victims during their young adulthood (between twenty and forty years of age), and one out of every four hundred young adults suffers from the disease.

As Dr. Brown discovered, multiple sclerosis is characterized by periods, sometimes lasting for years, in which the disease does not progress and even seems cured. Following her first attack, Dr. Brown experienced several more, often a year or more apart, which impaired the use of her limbs, then passed, leaving her normal. Between attacks, she kept active in her profession and worked vigorously to keep herself physically fit. She learned to ski and made canoe trips to Minnesota and Ontario. She continued research in neurological diseases like her own. She studied in London, became a resident in neurology at Bellevue Hospital in New York City, was the first woman intern at Boston City Hospital. She was a neurologist at New England Hospital and later at Massachusetts General Hospital. By 1940, when she became an instructor in the Harvard Medical School, her left leg was permanently weakened. Nevertheless, she took on more duties during the war.

Gradually, Dr. Brown lost ground against her disease. In 1953, she bought her first wheel chair. And four years later, she was so severely handicapped that she purchased a hydraulic lift to move her from her wheelchair. Today, Dr. Brown is almost totally handicapped and must rely on other people and a host of mechanical gadgets to perform even the simplest tasks of turning pages, eating, and smoking. Yet, as the photos on these pages indicate, she continues her work.

◂Although confined to her wheel chair, Dr. Brown is still active. Here she attends a lecture in Massachusetts General Hospital.

Virtually unable to use her limbs, Dr. Brown must be moved by others. A hydraulic lift on her car makes the task much easier.

Dr. Brown regularly attends neurological conferences in the Ether Dome where the medical use of ether was first demonstrated.

Until recently, Dr. Brown served on the faculty of the Harvard Medical School. She still teaches neurology to four third-year medical students.

She watches as a student checks eye movement in the diagnosis of a neurological disease. Her illness helps her ask pertinent questions and interpret responses.

Visiting an exhibit at the hospital, Dr. Brown passes a display of her research on the inheritance of muscular atrophy in two New England families. Her project is a continuation of a study of the same two families begun by Dr. William Osler in 1880.

An uncommon courage

DR. BROWN'S OWN ATTITUDE toward her handicap is rather matter-of-fact, and she has said, "There are two ways of meeting this thing. One way is to go to bed and not move out for the rest of your life. The other way is just to do your best." Her choice is obvious: Since her confinement to a wheel chair, she has received the Elizabeth Blackwell Citation and has been named Medical Woman of the Year by the New England Medical Women's Association.

But Dr. Brown is aware that she has been more fortunate than some others. No amount of courage and determination can keep some of these victims active. The rapid and devastating onslaught of multiple sclerosis can reduce a person to a hopeless and helpless cripple to whom advice about staying active and eating properly is nonsense.

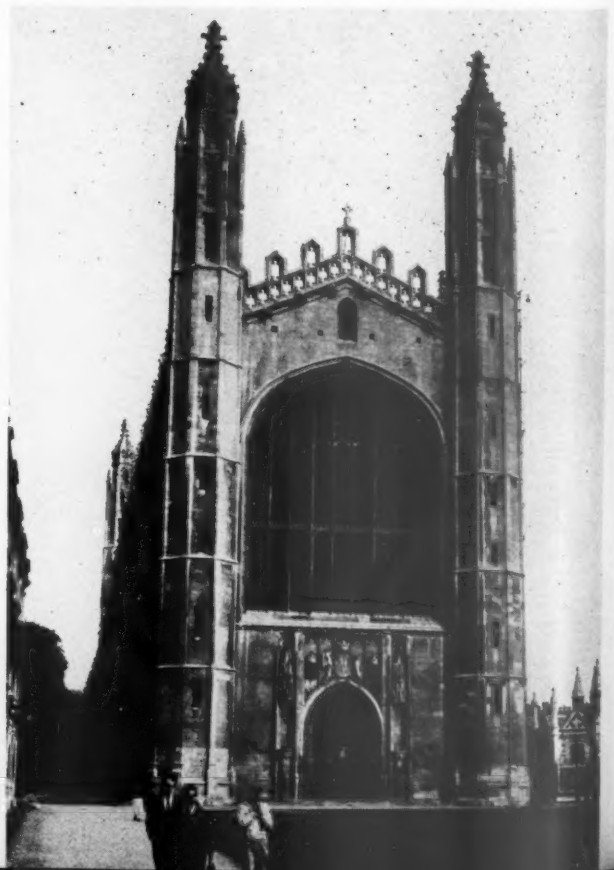
The victims who do have a choice between going to bed and staying active may find in Dr. Brown's experience a measure of hope. Since 1927, she has lived with a disease that would eventually overcome her. Yet, after each attack, she intensified her effort to make the best use of what was left to her. Even today, when the disease is in its most advanced stages, and when she knows the ultimate outcome, she does her best. And this takes uncommon courage.

Though she still has a private practice, Dr. Brown recently curtailed her office hours and sees only a few of her regular patients.

Dependent on other people and a host of gadgets to stay active, Dr. Brown say, "I'm not heroic. I get up to escape boredom."

Queens' College, founded in 1448 on the Backs of the Cam River, was the home of the scholar Erasmus in the sixteenth century.

King's College Chapel and its Tudor architecture dominate the center of the university. Designed by King Henry VI, founder of King's College, the Chapel was begun in 1446 and not completed for sixty-nine years. Its interior has often been called a miracle of engineering skill.



Photographed for the Johns Hopkins Magazine by Alan J. Bearden

Cambridge University

After centuries of political and religious entanglement, it emerged a free institution in the nineteenth century

In their rise to eminence, the universities of Europe were frequently embroiled in political and religious controversies. Cambridge University was no exception. Its history was significantly influenced by its deep involvement in the establishment of the state church of England.

From its early beginnings as a gathering place for church scholars and teachers, Cambridge passed through various stages, wherein it wavered between loyalty to the Crown and the established Church and loyalty to freedom of thought.

Until the fifteenth century, Cambridge's growth was steady and its significance was recognized, but it was still overshadowed by its venerable sister institution, Oxford. Only when John Wycliffe preached his "heretical" doctrine at Oxford, did the Clergy and the Crown look to Cambridge as a favorite daughter, expected to carry on the accepted religious doctrines.

Under the protective and attentive eyes of the Monarch and the Church, Cambridge quickly emerged as the center of orthodoxy and conformity. But this new-found favor enjoyed by Cambridge promoted not only a fertile atmosphere for the growth of orthodoxy, but for the development of scholarship in general. New colleges and professorships were created, and students flocked to the banks of the River Cam to hear the masters there, the greatest of whom was Erasmus, the most notable scholar of the Renaissance. To orthodox Cambridge, he brought the humanism and spirit of free inquiry that typified the rise of thought in the Renaissance, and he fostered the study of Greek and the works of the "orators and poets." While at Cambridge, he did most of his work on the exposition of the New Testament and completed his editions of St. Jerome.

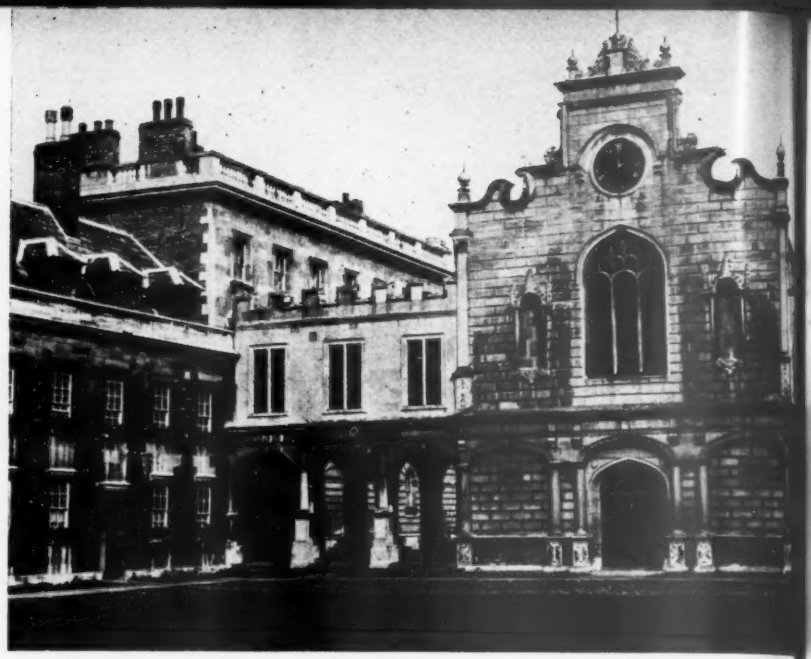
By allowing this new spirit of learning to flourish, the Church unwittingly set the stage for the influx of reform-movement thinking that had begun with Luther and was gathering momentum throughout Europe. As a result, the Roman Church would eventually fade as a political force in England.

In 1535, when Henry VIII set before the university the question of the legality of his marriage to Katherine of Aragon, he created for Cambridge, as well as for the rest of England, a conflict between loyalty to the Crown and adherence to religious dogma—a conflict that would not be entirely resolved until the Restoration of 1660.

Whereas Cambridge had formerly reflected the wishes of the Monarch, it suddenly split into two strongly opposed parties over the question of the powers of the king in religious matters. Henry VIII was not a man to tolerate such opposition to his will. He ordered the death of John Fisher, chancellor of the university and its most active champion during its high point of growth, for refusing to accept the supremacy of the Crown over the Roman Church. Henry named Thomas Cromwell, a loyal supporter, to head the university.

Immediately a series of injunctions were issued by

Our Academic Heritage: Cambridge



Peterhouse, oldest of the colleges, has a history dating from 1281. The niches over the main entrance have been empty of sacred images since 1643.

Cromwell demanding full acceptance of Henry's decisions. Lectures on canon law were expressly forbidden. Daily lectures on Latin and Greek were required in all colleges, leading to new, freer interpretations of the Old and New Testaments, which replaced the texts of the scholastic philosophers.

When Henry went further in his anger with the Church and closed the monasteries, various religious houses at Cambridge were destroyed, and their many students were unable to continue their studies. Although scholarship had begun to rise after the Reformation, the large drop in enrollment plunged Cambridge momentarily into one of the low points of its history.

BUT HENRY MADE amends. As the first English monarch to be schooled in the new learning of the Renaissance, he was not without sympathy for the needs of the university. In 1540, he founded Regius professorships in divinity, civil law, physics, Hebrew, and Greek. Six years later, he laid the foundation for Trinity College, the largest of Cambridge's colleges and a center of "literature, the sciences, philosophy, good art, and sacred theology." Trinity has been described as the most striking example of the change from the medieval to the modern conception of education.

Cambridge was again the favorite of the court, and during the reign of Elizabeth I, it continued to be a fortress of Protestantism. But Cambridge had not seen the last of religious controversy, and although it was a stronghold of Anglicanism, the Puritan influence was beginning to be felt. The two colleges, Sidney Sussex and Emmanuel (which were to serve as models for Harvard and thus the university system in America), were founded as havens for partisans of non-conformity.

WITH THE OUTBREAK of the Civil War against Charles I, Cambridge found itself again participating in clerical and political issues. The townspeople of Cambridge, were generally on the Parliamentary and Puritan side, but the colleges, for the most part, remained Royalist and Anglican. Oliver Cromwell imprisoned the heads of three colleges for depositing college contributions into the coffers of the king, and in 1643, a Parliamentary garrison was established in the town. College bridges were removed, and sacred images and pictures in the college chapels were destroyed. Those who refused to accept the Solemn League and Covenant of the new government were expelled from their offices. (This included the heads of most of the colleges.)

In 1660, the Restoration allowed the return of the Royalists, and the ensuing Act of Uniformity made certain that all holders of university and college offices would declare armed resistance to the Crown unlawful and would conform to the dogmas of the Church of England. With the coming of William and Mary to the throne, the establishment of the state church was complete, and for two centuries, Cambridge lived in relative harmony with the Church.

In the wake of the gradual reform that was stirring all of England in the nineteenth century, however, scholars began to chafe under the intellectual restrictions of the pledges of fidelity to the Anglican Church which were required of all university office holders and candidates for degrees. After repeated petitions, Parliament finally abolished the religious oath (for all but divinity teachers and their students) in 1871, and Cambridge at last gained a tolerance for the pursuit of individual thought and took its place as an outstanding free institution in the English-speaking world.

A Johns Hopkins Gazette

AN UNOFFICIAL COMPENDIUM OF FACULTY AND ALUMNI APPOINTMENTS, HONORS, AND ACCOMPLISHMENTS

DEATHS

ROBERT EDWIN GAINES, G. '87–'88 (mathematics); on June 19, 1959. He was professor emeritus of mathematics at the University of Richmond.

MAUDIE STONE (MRS. LEVI S.) CHAPMAN, medicine '01–'02; on May 11, 1959. She was living in Syracuse, N. Y.

ELEANOR CHACE (MRS. EDWARD) HERBERT, M.D. '01; on January 10, 1959. She was living in Fall River, Massachusetts.

WILLIAM KIRK, B.A. '02, PH.D. '05 (political economy); on July 27, 1959. Before his retirement, he was professor of sociology at Pomona College in California.

WALTER LEWIS BARBER, medicine '03–'06; on April 10, 1959. He was associated with Waterbury Hospital in Waterbury, Connecticut.

MILTON C. WINTERNITZ, B.A. '03, M.D. '07, fellow '07–'08, (pathology), fac. '08–'17 (medicine), house staff '09–'16 (pathology); on October 3, 1959. Dr. Winternitz was the former dean of the Yale University School of Medicine.

ARTHUR I. KENDALL, PH.D. '04 (bacteriology); on June 20, 1959. He was professor emeritus of bacteriology at Northwestern University.

CARLOS A. BLUME, G. '05–'09 (Greek, Romance languages); on April 6, 1959. Before his retirement he was a teacher in Washington, D.C., public schools.

JONATHAN C. MEAKINS, fac. '06–'07 (medicine); on October 12, 1959. He was former physician-in-chief of the Royal Victoria Hospital and dean of the faculty of medicine at McGill University in Montreal.

SARAH R. ADDISON, graduate nurse '07; on April 26, 1959. Miss Addison, an American Red Cross nurse, had been decorated by the king of Greece for her work in fighting the 1919 typhus epidemic in Greece.

ALBERT H. LICKLIDER, PH.D. '07, fac. '07–'08 (English); on July 31, 1959. Before his retirement he was chairman of the department of English at Williams College.

LEONARD G. ROWNTREE, fac. '07–'16 (medicine, experimental therapeutics); on June 2, 1959. He was living in Miami Beach, Florida.

NORMAN F. LE CRON, arts '09–'10; on July 20, 1959. He was a dentist in Baltimore.

C. H. MCCLOY, medicine '11–'13; on September 18, 1959. He was professor of physical education at the State University of Iowa.

WILLIAM KENDALL, JR., arts '13–'17; on July 4, 1959. He was a resident of New York.

CHARLES I. SNYDER, B.A. '14; on August 29, 1959. He was a resident of Baltimore.

WALTER M. DUFUR, engineering '15–'17; on August 21, 1959. He was living in Fort Myers, Florida.

JAMES L. GAMBLE, fac. '15–'22 (pediatrics); on May 28, 1959. He was professor emeritus of pediatrics at Harvard University.

STELLA BOWLBY (MRS. ARTHUR H.) PRIEST, graduate nurse '15; on July 13, 1959. She was living in Preston, Ontario, Canada.

JULIA MCHENRY HOWARD, G. '16–'17 (history); on July 10, 1959. She was a retired teacher in Baltimore.

ERNEST CLAY SHULL, medicine '19–'20; on May 7, 1959. He was a physician in Herndon, Virginia.

NORMAN B. COLE, fac. '20–'43 (clinical medicine), Hospital staff; on August 18, 1959. Dr. Cole was a specialist in circulatory diseases and a leader in youth activities in Baltimore.

CHARLES T. LEBER, B.A. '20; on July 30, 1959. He was a Presbyterian minister.

HARRY C. WEISKITTEL, JR., B.A. '20; on August 1, 1959. He headed a manufacturing firm in Baltimore.

MARGARET MARY CORRIGAN, B.S. '21, G. '21–'23 (archaeology); on July 27, 1959. She was living in Stamford, Connecticut.

RICHARD S. LYMAN, M.D. '21, fac. '22–'25, '38–'40 (medicine), house staff '21–'22 (psychiatry); on June 14, 1959. He was a former professor of neuropsychiatry at Duke University.

A PROFESSOR DIES

ALAN J. BEARDEN

Sidney Painter

SIDNEY PAINTER, professor and chairman of the department of history; on January 12, 1960.

Dr. Painter, who received his doctorate from Yale University in 1930, was a member of the Hopkins faculty for nearly thirty years and had been a visiting lecturer at Oxford and other European universities.

An authority on medieval history, Dr. Painter's works included *A History of the English Feudal Barony*, *The Reign of King John*, *Medieval Society*, and *A History of the Middle Ages*.

In 1953, he was elected a fellow in the Medieval Academy of America and served on the council of the American Historical Association. He was also active in the Johns Hopkins chapter of Phi Beta Kappa and the History of Ideas Club. He served on the board of the Peabody Conservatory and was president of the board of trustees of the Roland Park Country School.

Dr. Painter's colleagues have established a fund in his memory to be used to support the work being carried on in the department of history.

JOSEPH A. NAVIASKY, B.S. '22; on July 9, 1959. He was living in Baltimore.

MARY LUCILLE GORMAN, G. '23–'27, '31–'33 (education); on July 10, 1958. She was living in Glen Arm, Maryland.

NATT C. JACOBS, medical arts '23–'25, fac. '24–'25 (medical arts); on September 13, 1958. He was a medical illustrator at the Rochester School of Medicine and Dentistry.

FLORENCE BANGERT (MRS. WILLIAM A.) NAJER, B.S. '24, G. '24–'25 (education); on February 16, 1959. She was living in Baltimore.

RICHARD ARTHUR BOLT, DR.P.H. '25; on August 3, 1959. Dr. Bolt was known as an authority on child health problems.

KATHERINE F. MUESSE, B.S. '25, M.A. '31 (education); on August 31, 1959. Before her retirement she was a principal in Baltimore public schools.

JULIA S. MOHRLEIN, B.S. '26, G. '26–'31 (education); on July 23, 1959. She was living in Baltimore.

MARGARET TICKNER (MRS. CARROLL M.) BERNDT, G. '27–'30 (mathematics); on February 17, 1959. She was living in Lutherville, Maryland.

HENRIETTA MORRIS, SC.D. '27 (hygiene); on August 1, 1959. She was associate professor of hygiene at Oregon State College.

HOWARD M. ZIMMERMAN, B.E. '27; on March 28, 1959. He was chief structural engineer for the U. S. Government General Service Administration.

ACHSAH GIBSON (MRS. GEORGE H.) HAINES, B.S. '28, G. '30–'33 (education); on February 4, 1959. She was living in Baltimore.

LLOYD G. LEWIS, M.D. '28, fac. '30–'46, house staff '28–'33 (urology); on March 3, 1959. He had been head of the urology department of Georgetown University School of Medicine.

HORACE BOLTON LODER, M.D. '28; on September 14, 1958. He was a member of the medical staff of Bridgeton (N. J.) Hospital.

JOHN CHARLES REISINGER, house staff '28–'30 (medicine); on March 5, 1957. He was on the staff of the Central Dispensary and Emergency Hospital in Washington, D. C.

RALPH BENTLEY STEWART, PH.D. '28 (geology); on November 29, 1958. He was formerly with the U. S. Geological Survey.

IRMGARD DRESEL, DR.P.H. '29, fac. '25–'28 (bacteriology); on July 23, 1959. He was a physician in Far Hills, New Jersey.

REGINALD ICETON JAMES, G. '29–'31 (history); on February 27, 1959. He was a lecturer at the University of Glasgow.

CLOVIS HAMILTON PHILLIPS, house staff '29–'30 (gynecology); on May 29, 1958. He was associated with Lakeside and Veterans Administration hospitals in Cleveland, Ohio.

MARION MARY ELIZABETH BROADBENT, G. '30–'31 (archaeology); on May 25, 1959. She was a teacher in Glens Falls, New York.

ONIS GEORGE HAZEL, M.P.H. '30; on December 8, 1957. He was living in Oklahoma City.

CATHERINE ROHRBAUGH, graduate nurse '30; on March 23, 1958. She was living in Hanover, Pennsylvania.

KATHERINE TERRY (MRS. THOMAS P.) SPRUNT, G. '30–'32 (history); on February 22, 1959. She was living in Baltimore.

SAMUEL CURTIS VESTAL, fac. '30–'33 (Page School of International Relations); on October 21, 1958. He was living in Pasadena, California.

CURTIS BEETHAM, engineering '31–'33; on March 31, 1959. He was living in Chambersburg, Pennsylvania.

CARL H. BROEDEL, B.A. '31, PH.D. '35 (geology); on August 13, 1959. He was associated with the U. S. Geological Survey.

MARION HOWARD (MRS. ASHLEY W.) OUGHTERSON, M.D. '31, fellow '31–'32 (medicine); on January 5, 1959. Dr. Howard was formerly an associate clinical professor of medicine at Yale.

HENRY GAYMER SMITH, B.S. '32; on March 16, 1959. He was with the U. S. Atomic Energy Commission.

HARVEY BENJAMIN BLANTON, B.S. '32, G. '32–'35 (political economy); on April 1, 1959. He was a food company executive.

ALICE WALDO, G. '32–'33 (political science); on April 10, 1958. She was living in New York City.

ISABELLA BECKENBAUGH (MRS. CLARENCE A.) MILLER, B.S. '33; on April 17, 1959. She was living in Baltimore.

HENRY M. COOPER, JR., G. '34–'35 (political economy); on August 17, 1959. He was living in Baltimore.

JAMES FARRAR LEWIS, M.D.'35; on February 15, 1957. He was head of the department of internal medicine at the Doster Hospital clinic in Columbus, Mississippi.

TALBOTT HUNT WALKER, B.E. '35; on April 8, 1957. He was one of the owners and directors of the Drumcastle Apartments Corporation in Baltimore.

JESSIE M. WETTER, graduate dietitian '35; on September 21, 1959. She was chief dietitian at Sinai Hospital in Baltimore.

THEODORE LORING DANFORTH, M.D. '36, fac. '41–'42 (medicine); on January 3, 1959. He was a physician in Stamford, Connecticut.

THEODOR ERNST MOMMSEN, fellow '36–'37, fac. '43 (history); on July 18, 1958. He was professor of medieval history at Cornell University.

CARLTON E. WILDER, PH.D. '36 (psychology); on June 30, 1959. He was living in Asheville, N. C.

BARBARA SCHUTZ (MRS. LOUIS W., JR.) LADD, graduate nurse '37; on May 13, 1959. She was living in Cleveland.

FRAY OWEN PEARSON, M.P.H. '37; on January 9, 1959. He was district director of public health for the state of Georgia.

WALTER E. PRICE, JR., B.A. '37; on January 11, 1959. He was a chemist with the Esso Standard Oil Company.

EDWARD B. BUKOWSKI, M.P.H. '39; on February 21, 1959. Dr. Bukowski was health commissioner of Erie County, New York.

ARTHUR W. TAYMAN, B.S. IN ENG. '38, M.S. IN ENG. '48 (sanitary); on January 15, 1958. He was Prince Georges County (Maryland) public works administrator.

CARL HINCKLEY WAITE, hygiene '38–'39, on December 5, 1957. He was a bacteriologist in charge of the Alabama State Branch Laboratory.

RANSOM J. JONES, M.P.H. '39; on August 20, 1959. He was a physician in North Carolina.

Poe-Eng Yu, fac. '39–'41, house staff '39–'41 (psychiatry); on July 28, 1958. He was associated with Connecticut State Hospital.

Robert E. Turner, G. '39–'41 (civil engineering); on February 27, 1959. He was associated with the Susquehanna Power and Light Company.

John Fielden Hackler, M.P.H. '40; on September 3, 1958. He was a physician in Muskogee, Oklahoma.

Robert L. Allen, M.D. '41, house staff '41–'43 (surgery); on July 31, 1959. He was chief surgeon at Knox County (Mo.) General Hospital.

Herbert R. Kobes, M.P.H. '41; on January 10, 1959. He was director of services for crippled children at the University of Illinois.

Marion Candler Lazenby, PH.D. '41 (German); on October 19, 1958. He was assistant professor of German at Lehigh University.

Alton Marcus McKissick, hygiene '41–'42; on December 26, 1957. He was director of the Knoxville Branch Laboratory of the Tennessee state department of health.

Victor H. Hanf, engineering '42–'43, '45–'48; on July 22, 1959. He was a captain in the U. S. Air Force.

Paul Oakes Chatfield, M.D. '43, house staff '43 (medicine); on November 18, 1958. He was assistant professor of neurology at Jefferson Medical College.

Ernest S. Kinsey, M.P.H. '45; on February 18, 1959. He was a physician in Syracuse, New York.

Ann Morlok (Mrs. Russell F.) Nonnan, B.S. '45, M.ED. '50; on August 29, 1958. She was an elementary school supervisor in Harford County, Maryland.

Clara Everist (Mrs. Milton E.) Streett, B.S. '45; on October 31, 1958. She was living in Bel Air, Maryland.

Joseph M. Janto, G. '46–'47 (education); on June 27, 1959. He was living in Baltimore.

Wallace Hubert Hildebrandt, medicine '46–'48; on September 25, 1958. He was living in Syracuse, New York.

Anna Hermann (Mrs. C. Oliver) Goldsmith, graduate nurse '47, McCoy '50–'51; on January 9, 1959. She was living in Ellicott City, Maryland.

Arnold Henry Krone, B.A. '49; on January 13, 1959. He was living in Baltimore.

Francis Gregory Malone, B.S. '49 (business); on December 29, 1958. He was living in Miami, Florida.

James Patton Miller, fac. '49–'58 (orthopedic surgery), assistant professor of orthopedic surgery; on February 1, 1959. Dr. Miller served on the medical faculty for nine years and recently was in charge of the children's orthopedic clinic at the Hospital.

Hudson James Bond, fac. '50–'54 (ICR); on December 2, 1958. He was living in Santa Monica, California.

E. Newton Harvey, D.SC. '50 (hon.); on July 21, 1959. He was Henry Fairfield Osborn professor emeritus of biology at Princeton University.

Stanley G. Kadala, JR., M.S. IN ENG. '50 (civil); on September 6, 1958. He was a lieutenant in the U. S. Navy.

Charles Loren Ransom, fac. '50–'52, house staff '49–'52 (urology); on December 14, 1958. He was living in Syracuse, New York.

William J. Carroll, B.A. '51; on October 2, 1959. He was living in Sparks, Maryland.

Daniel R. Lucchesi, B.S. IN ENG. '52 (civil); on September 24, 1959. He was living in Lutherville, Maryland.

Ethel Cecelia Ruppert, B.S. '52 (education); on December 31, 1958. She was an elementary school principal.

James MacDonald Terrell, G. '52–'53 (political economy); on November 18, 1958. He was an economist in the U. S. Department of Commerce.

John Alfred Dillon, JR., M.P.H. '54; on November 18, 1958. He was a lieutenant colonel in the medical corps of the U. S. Air Force.

Alan Scot Huggins, engineering '56–'57; on December 8, 1958. He was living in Towson, Maryland.

Robert N. C. Hunt, fac. '56–'57 (SAIS); in January, 1959. He was a professor at St. Anthony's College, Oxford.

Jack Arden Light, engineering '56–'57; on July 27, 1957. He was a resident of Centre Hall, Pennsylvania.

Thomas Paul Petraska, engineering '56–'57; on August 15, 1957. He was living in Brooklyn, Maryland.

Lester Williams, arts '56–'58; on June 27, 1958. He was living in Baltimore.

Roger L. Livingston, G. '58–'59 (geology); on September 9, 1959. He was a native of Morton, Pennsylvania.

BOOKS

Following is the spring list of books published by the Johns Hopkins Press, with approximate publication dates and estimated prices:

Elizabeth Parker: *The Seven Ages of Woman* (April, $6.50).

Norman Friedman: *E. E. Cum-*

New Dimensions in Engineering Careers at Westinghouse

Engineers with the vision to pioneer tomorrow's new dimensions will find unprecedented career opportunities at Westinghouse-Baltimore. Here, technological breakthroughs in Molectronics, Missile Guidance, Computer Development, Communications, Electronic Counter-Measures and Space Age Electronics are adding new dimensions to engineering careers.

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mings: The Art of His Poetry (April, $4.50).

GERDA BLUMENTHAL: *André Malraux: The Conquest of Dread* (May, $4).

DON CAMERON ALLEN, Sir William Osler professor of English literature and chairman of the department of English: *Image and Meaning: The Classical Tradition in Renaissance Poetry* (May, $4).

CAROL HOPKINS (MRS. ANGUS) MADDISON, M.A. '42, PH.D. '57 (English): *Apollo and the Nine: A History of the Ode* (February, $6).

H. SHIRLEY THOMAS, M.A. '55, PH.D. '59 (political science): *Felix Frankfurter: Scholar on the Bench* (June, $5.50).

GOTTFRIED DIETZE, associate professor of political science: *The Federalist:* (June, $6.50).

JAMES H. OLIVER, professor of Greek: *Demokratia, the Gods, and the Free World* (June, $5).

EARL R. WASSERMAN, professor of English: *Pope's Epistle to Bathurst* (June, $5).

ROBERT FORSTER, PH.D. '56, fac. '56–'57 (history): *The Nobility of Toulouse in the Eighteenth Century* (May, $5).

CHARLES D. FLAGLE, JR., associate professor of industrial engineering, WILLIAM H. HUGGINS, professor of electrical engineering, and ROBERT H. ROY, professor of industrial engineering and dean of the School of Engineering: *Operations Research and Systems Engineering* (April, $14.50).

HERBERT KAUFMAN: *The Forest Ranger* (January, $5).

MARION CLAWSON, BURNELL HELD, and CHARLES H. STODDARD: *Land for the Future* (June, $8.50).

OTIS DUDLEY DUNCAN, WILLIAM R. SCOTT, STANLEY LIEBERSON, BEVERLY DAVIS DUNCAN, and HAL H. WINSBOROUGH: *Metropolis and Region* (June, $8.50).

HARVEY S. PERLOFF, EDGAR S. DUNN, JR., ERIC C. LAMPARD, RICHARD F. MUTH, fac. '55–'56 (political science): *Regional Economic Growth in the United States* (July, $12).

FRED B. PHLEGER: *Ecology and Distribution of Recent Foraminifera* (July, $7.50).

CARL S. SHOUP, JOHN F. DUE, LYLE C. FITCH, SIR DONALD MACDOUGALL, OLIVER S. OLDMAN, STANLEY S. SURREY: *The Fiscal System of Venezuela* (January, $8.75).

SHIRLEY BOSKEY: *Problems and Practices of Development Banks* (January, $3.50).

JANETTE C. CARLSEN, graduate dietitian '44, M.P.H. '51, dietitian-in-charge of the Hospital: *Manual of Applied Nutrition of The Johns Hopkins Hospital* (January, $3).

NEW ASSISTANT

Robert P. Sharkey

ROBERT P. SHARKEY, assistant director of admissions '53–'56, PH.D. '58 (history), has been appointed administrative assistant to Dr. Milton S. Eisenhower. Dr. Sharkey was formerly assistant professor of economics at the University of South Carolina.

THE ALUMNI

STANHOPE BAYNE-JONES, M.D. '14, M.A. '17 (pathology), fac. '15–'23, house staff '14–'17 (pathology, bacteriology, medicine), has been awarded an honorary degree by the Hahnemann Medical College and Hospital of Philadelphia. Dr. Bayne-Jones has also been appointed to the National Advisory Cancer Council.

FRANKLIN G. EBAUGH, B.A. '15, M.D. '19, house staff '19–'20 (psychiatry), has been elected a vice-president of the American Psychiatric Association.

ROBERT F. LOEB, fac. '20–'21, house staff '20–'21 (medicine), has been awarded the 1959 Kober Medal by the Association of American Physicians for his contributions to the medical sciences

FRANCIS O. RICE, fac. '24–'38 (chemistry), has retired as professor and head of the department of chemistry at Catholic University. He will head the department of chemistry at Georgetown University.

WILLIAM M. NICHOLSON, M.D. '31, fac. '32–'35 (medicine, pathology), house staff '31–'32 (medicine), has been appointed assistant dean in charge of postgraduate education at Duke University.

JOHN H. DINGLE, SC.D. '39 (hygiene), has been elected president of the Central Society for Clinical Research.

JAMES W. HAVILAND, M.D. '36, fac. '37–'40, house staff '36–'40 (medicine, pediatrics), has resigned as assistant dean of the school of medicine at the University of Washington to enter private practice.

ROBERT W. WILKINS, fac. '38–'40 (medicine), has been appointed to the National Advisory Heart Council for a four-year term.

HARRISON S. BROWN, PH.D. '41 (chemistry), professor of geochemistry at the California Institute of Technology, has received the $2,500 Albert Lasker award.

MARCOLINO G. CANDAU, M.P.H. '41, has accepted a second term as director-general of the World Health Organization.

WALLACE S. BROOKE, M.D. '42, house staff '42–'43 (medicine, surgery), has been named president-elect of the Utah State Medical Association.

ROBERT H. FELIX, M.P.H. '42, has been named president-elect of the American Psychiatric Association.

BLANCHE D. COLL, B.S. '43, M.A. '48 (history), has been honored by the U. S. Army for her work on the history of the role of the Corps of Engineers in World War II.

HERBERT E. DUQUETTE, JR., B.E. '43 (civil), has been promoted to the rank of commander in the U.S. Navy.

CLIFFORD T. MORGAN, fac. '43–'59 (psychology), has been appointed visiting professor of psychology at the University of Wisconsin for the 1959–60 academic year.

JERRY H. GELLER, G. '45–'46 (chemistry), has become chief chemist of the Veterans Administration Hospital in Pittsburgh.

ROBERT H. HAMLIN, house staff '46–'47 (surgery), has become associate professor of public health administration at Harvard University.

DUNCAN HOLADAY, fac. '47–'50 (pharmacology, experimental therapeutics), has been appointed professor of surgery and head of the section of anesthesia in the department of surgery at the University of Chicago.

RICHARD H. HOWLAND, PH.D. '47

(architecture and art), fac. '46–'56 (art), has been presented a citation by Brown University for his contributions as an architectural historian.

HENRY M. BOETTINGER, B.E. '48, has been named vice-president and comptroller of the Michigan Bell Telephone Company.

EVAN CALKINS, fac. '48–'50, house staff '45–'46, '48–'50 (medicine), has been appointed director of the arthritis unit and laboratories at the Massachusetts General Hospital. He is also assistant professor of medicine at the Harvard Medical School.

JOSEPH F. SCHREIBER, JR., B.A. '48, M.A. '50 (geology), has been named associate professor of geology at the University of Arizona.

WILBERT F. KOEHLER, PH.D. '49 (physics), has been promoted to head of the physics division of the research department at the U.S. Naval Ordnance Test Station in China Lake, California.

S. FRANCIS THOUMSIN, JR., G. '49–'50 (geology), has been named chairman of the science department at Chestnut Hill Academy in Norristown, Pennsylvania.

RAY Y. GILDEA, JR., G. '51–'52 (geology), has been appointed assistant professor of economics at the Alabama Polytechnic Institute.

EUGENE F. MURPHY, PH.D. '51, fac. '51–'53 (Romance languages), has been appointed professor and head of the department of modern languages at Hobart and William Smith Colleges. Dr. Murphy has also received the Russell award for excellence in teaching.

RICHARD P. NICKELSEN, M.A., '51, PH.D. '53 (geology), has been appointed associate professor and chairman of the department of geology and geography at Bucknell University.

WALTER H. BREEN, B.A. '52, has been appointed acting president of the Foundation for the Gifted Child in New York City.

HUGH M. HILL, M.D. '52, fac. '53–57 (gynecology), house staff '52–'57 (gynecology), has been appointed assistant professor of obstetrics and gynecology at the University of Florida.

JULIUS H. JACOBSON, II, M.D. '52, has been appointed associate professor of surgery and director of surgical research at the University of Vermont.

THEODORE BURNSTEIN, fac. '53–'55 (parasitology), has been appointed research associate professor of microbiology at the University of Miami (Fla.).

MARGARET BAILLY BATSON, fac. '53–'55 (medicine), staff '54–55, house staff '51–'52 (pediatrics), has been appointed associate professor of pediatrics, assistant professor of psychiatry, and chief of the newly-created division of human behavior at the University of Mississippi.

MARVIN L. DAVES, M.D. '53, house staff '54–'57 (radiology), has been appointed assistant professor of radiology at the University of Arkansas.

GORDON F. FISHER, M.P.H. '53, has been appointed chief of the preventive medicine division of the Air Force.

EARNEST F. GLOYNA, DR. ENG. '53 (sanitary), fac. '51–'52 (ICR), has been promoted to the rank of professor of civil engineering at the University of Texas.

WILFORD N. PAUL, B.S. '53, M.A. '56, G. '56–'57 (philosophy), has been appointed assistant professor of philosophy at New Mexico State University.

MORTON M. WEBER, SC.D. '53, fac. '52 – '56 (microbiology, McCollum-Pratt), has been named assistant professor of microbiology at St. Louis University.

CALVIN A. LANG, SC.D. '54 (hygiene) fac. '56–'59 (pathobiology), has been appointed assistant professor of biochemistry at the University of Louisville.

LOUIS R. HARLAN, PH.D. '55 (history), has been appointed associate professor of history at the University of Cincinnati.

RICHARD F. MUTH, fac. '55–'56 (political economy), has been appointed associate professor of urban economics at the University of Chicago.

JOHN E. COLMAN, M.A. '56, PH.D. '58 (education), has been appointed dean of the graduate school and the school of education at Niagara University in New York.

NORMAN S. COHN, fac. '57–'59 (biology), has been appointed assistant professor of botany at Ohio University in Athens, Ohio.

MERCEDES M. FISCHER, M.P.H. '57, has been appointed head of the health nursing branch of the surgeon general's office of the U. S. Army.

ROGER L. B. SLAKEY, JR., PH.D. '57 (aesthetics of literature), has been appointed assistant professor of English at Georgetown University.

ROBERT S. KAPNER, DR. ENG. '59, has been appointed assistant professor of engineering at Rensselaer Polytechnic Institute.

RAM SARUP, PH.D. '59 (physics), has been appointed assistant professor of physics at Valparaiso University in Indiana.

Arthur E. Raymond, Senior Engineering Vice President of Douglas, goes over a proposed lunar trajectory with Maxwell Hunter, Asst. Chief Engineer—Space Systems

Guided tour of the solar system

The new NASA Thor-boosted research rocket, DELTA, now in production at Douglas, will set up important signposts for further space explorations.

Combining elements already proved in space projects with an advanced radio-inertial guidance system developed by the Bell Telephone Laboratories of Western Electric Company, DELTA has the versatility and accuracy for a wide variety of satellite, lunar and solar missions. Douglas reliability rides with these 90 foot, three-stage rockets on every flight.

Douglas is now seeking qualified engineers, physicists, chemists and mathematicians for programs like ZEUS, DELTA, ALBM, GENIE, ANIP and others far into the future. For full information write to Mr. C. C. LaVene, Douglas Aircraft Company, Inc., Santa Monica, California, Section FF.

DOUGLAS

MISSILE AND SPACE SYSTEMS ■ MILITARY AIRCRAFT
DC-8 JETLINERS ■ CARGO TRANSPORTS
AIRCOMB ■ GROUND SUPPORT EQUIPMENT

A New Look At Venus

Continued from page 7

But use of a balloon posed certain problems. Even though a balloon with a telescope could reach 80,000 feet for an unobstructed look at a planet, the gondola would not be stable enough as an astronomical base. When looking at an object millions of miles away, the angle of the telescope is so critical that a slight wind, movement of the telescope, or actions of observers inside the gondola would make it almost impossible to hold the telescope stationary long enough to secure a valid spectroscopic record.

Low temperatures during ascent and while floating at peak altitude would also be a serious problem. Condensation would create another barrier to success; as a gondola-mounted telescope soared up through the atmosphere its mirrors might become fogged.

Nevertheless, when approached in 1956 by the Navy men who knew of his interests, Dr. Strong was eager to meet the challenges. Johns Hopkins and the National Science Foundation cooperated with the Office of Naval Research on the project. There was an urgency to their mission, for in September of 1956, the planet Mars would be at its closest distance to the earth—only thirty-five million miles away, a position it would not reach again until 1971. It being impossible to meet this deadline, a more realistic target date was set for November of 1958, when Mars would still be only forty-five million miles away.

Applying his creative, scientific skill to the many problems involved, Dr. Strong began to design a new telescope, electronically controlled, which could be locked in on a planetary objective in spite of the movement of a gondola in the stratosphere.

To accomplish the results sought, the telescope had to be centered on the celestial objective within one second of arc, or 1/1,296,000th of a circle, which meant that if the gondola swayed even a few inches the telescope would lose its fix on the planet. Dr. Strong conceived the idea of using an ingenious device which, with extraordinary precision, would lock-in electronically and hold the planet in sight once the manually operated telescope had located its objective.

WILLIAM C. HAMILTON

Dr. John Strong, director of the Stratolab project, is internationally famous for other scientific accomplishments; e.g., *his machine for ruling diffraction gratings and his process for coating telescope lenses, which was used on Mt. Palomar's telescope.*

The device was the *star tracker*, which was designed and built especially for Dr. Strong's project by Librasope, Incorporated, of Glendale, California. A simple analogy of this complex mechanism is that of a hunter with a rifle who is standing on a rotating platform and aiming at a bird flying in another direction. His eye and hands coordinate to lock the rifle on the target as both platform and target move independently. The hunter's use of his eye and hands correspond to the star tracker's use of a servo-mechanism, an aiming device based on the principle of the gyroscope, and its controlling robot intelligence to lock the balloon-borne telescope on its target.

The total telescopic system created by Dr. Strong consisted of two telescopes, one within the other: a large, sixteen-inch reflecting telescope with an eighteen-inch focal length, and a small, three-inch diameter Cassegrain telescope encased in the forward end of the large telescope's tube. Still another optical relay system was employed as a visual finder to be operated manually for the initial fix on the planet, which when found was then to be taken over by the servo-mechanism.

Once the telescope and star tracker were focused on the objective, the light from the planet would enter the telescope, pass through various systems of optical mirror relays, photomultipliers sensitive to infrared light, and four diffraction gratings. The reflected light would then streak down into the tube containing the recording equipment inside the gondola, to activate a heated stylus which moves across wax-coated paper to etch a spectrographic record of the chemical elements in the atmosphere of the planet being investigated.

Working with his own staff, directed by John McClellan, and with a number of precision instrument makers, Dr. Strong assembled the complex telescope in his Hopkins laboratory. By September, 1958, most of the work was completed with just a few months left until target date for the launch: November 8.

Although he had no previous experience in ballooning, Dr. Strong decided to make the fifteen-mile ascent himself as scientific observer, with Commander Ross as pilot.

In mid-October, the telescope was shipped to the Stratobowl in the Black Hills. The natural, bowl-shaped depression was selected as the launch site because of its depth. Here, when there would be little wind, the balloon could be inflated, allowed to rise and remain virtually motionless. When released, it would float straight up and not endanger the gondola and its occupants by a possible wind-drag across the earth, as it might were the launch made on flat, open ground.

Equipment was moved down the twisting, steep road from the rim to the floor of the bowl. Scientists from Johns Hopkins, the Office of Naval Research, and instrument companies met to begin the painstaking preparations for launch. Finally, the telescope was fitted into the gondola. Night after night it was tested.

Then began the tedious waiting and hoping for coördination of all eight of the "commandments" necessary for safe launch of the manned balloon: (1) The winds on the floor of the Stratobowl must be less than three knots. (2) Winds blowing across the rim of the bowl must be less than seven knots. (3) Winds to be encountered during the 80,000-feet ascent must be less than eighty-five knots with no shear, *i.e.*, no major change in direction. (4) At floating (peak) altitudes, winds must not exceed an average of twenty-five knots. (5) Temperature of the tropo-

pause (the borderline area between our lower atmosphere and the stratosphere) must be higher than 65°F. (6) Winds determining the flight trajectory must carry the balloon into the flatlands of Kansas or Illinois, not toward the Great Lakes or western mountainous areas. (7) At the landing area (twenty-eight hours after launch) winds must be predicted as light and not variable. (8) Cloud cover (again, twenty-eight hours after launch) must be less than "broken" for good visibility on landing.

Capriciousness of weather is well known. Finding all eight "commandments" for a launch coördinated at one time seems an impossibility. So it must have seemed to the men who waited for days, then weeks, for launch weather. Many times they came within two hours of launch when the weather factors suddenly shifted.

Then on Wednesday, November 26, the eight "commandments" fell into place. As light snow fell, the count down began. Strong and Ross suited up. The snow stopped. The balloon was inflated and rose majestically over the gondola. Just as the hatch was about to be closed Dr. Strong heard someone shout, "The balloon has burst!" Commander Ross looked out through one of the observation portholes and saw the balloon crumpling toward the ground like a wounded jelly fish. The balloon had burst along a seam.

Human tragedy had been averted. If the rip had occurred a few hundred feet above the ground, both gondola and balloonists would have plummeted to the earth. Scientific tragedy had not been averted, because Mars was moving swiftly away from the earth, not to return that close for another eleven years. The project was abandoned and everyone flew home to a rather somber Thanksgiving Day.

RECOVERING FROM THIS initial defeat, the scientists began planning for another try in October, 1959, this time to study the atmosphere surrounding Venus to determine whether it contained water vapor. Dr. Strong asked Dr. Moore, the veteran balloonist, to accompany Commander Ross as observer on this trip.

Late in September of 1959, the team gathered again in the Stratobowl. New procedures had been developed. Work, waiting, and disappointments followed one another. Twelve times the group came within six hours of launch. Six times Ross and Moore suited up and came within five hours of launch, only to find that the eight "commandments" had become dangerously scrambled. Once they came within two hours of launch. A balloon was laid out, then discarded, and the launch cancelled.

While making observations through the grounded telescope on the evening of Friday, November 27, Dr. Strong was informed that weather predictions were encouraging. Later that night, reports were even better. After midnight, pre-launch preparations were begun.

Fears, born of past experience, mingled with hope down to the last minute when the launch was made at 10:16 a.m.—and all eyes watched the balloon clear the rim of the Stratobowl and begin its 28½-hour trip.

Decades of scientific experience, years of creating a unique telescope, and months of painstaking preparation turned heart-breaking disappointment into a scientific triumph. The Stratolab balloon reached its altitude. The complex telescope-spectroscope instruments

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functioned perfectly. Light from Venus streamed through the telescope's tiny slit, sped down through the system of mirrors, and entered the spectroscope. The needle darted swiftly back and forth across the sensitized paper, graphically recording the narrow band of infrared light waves in which any evidence of water vapor would have to appear.

While Dr. Strong followed in a plane beneath the path of the balloon, holding radio contact with the "stratonauts" through the fifteen-mile ascent, Ross and Moore skillfully performed their scientific investigations. They gathered factual information and commented lyrically on the bright, untwinkling stars above them, the pattern of light-dotted cities below, and later, the fabulous flash of sunrise over the rim of the world. Professional proficiency and rhapsodic description are dual qualities inherent in scientists who soar upward past the "point of separation" where they no longer feel a part of the mortal world.

Lyricism gave way to practicality when Ross and Moore began their descent on Sunday, November 29. Having drifted three hundred and fifty miles from the Stratobowl, the balloonists finally floated above a pasture thirty miles from Manhattan, Kansas. Winds were carrying them too fast. Nevertheless, Commander Ross had to jettison the balloon as the gondola neared the ground. A sudden gust of wind caught the hundred-foot emergency parachute, billowed it, and dragged the gondola a quarter of a mile across rough terrain. Inside, men and equipment were tossed about. Although Commander Ross was badly stunned, the recording equipment was undamaged, and the first results were ready for Dr. Strong's immediate study.

THE JAGGED LINES spelled it out indisputably: the atmosphere of Venus contains water vapor. The announcement came from Dr. Strong just a few hours after the balloon landed, even though a quantified analysis of all the data is still to be completed.

Until this new information is coupled with other knowledge of Venus, no startling conclusions can be drawn. But the many theories about the atmosphere of Venus—ranging from the suggestion that Venus is covered by clouds of dust to the theory that the atmosphere is composed of formaldehyde and tiny suspended particles of plastic—must take into consideration the new evidence of water vapor and be re-evaluated. Nevertheless, those who want to know whether Venus supports life, or can support life, will have to wait until more fragments of the puzzle are fitted together.

Not only did the balloon ascent of November 28 close an important gap in the puzzle of Venus, it also proved the feasibility of balloon-borne observations. The technique has advantages over its front-page competitors, missiles and satellites; it is cheaper, the equipment can be used over and over again, and observations can be made from practically the same position for a relatively long period of time.

The first success, of course, was only a beginning. There are "bugs" to be worked out and perfections to be made in the equipment. "But," says Dr. Strong with confidence, "we must expect to do some crawling before we walk and some walking before we run."

—LYNN POOLE

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Events At Johns Hopkins

VARSITY SPORTS

FENCING—Johns Hopkins vs. HAVERFORD on Saturday, Feb. 27 (Homewood gymnasium at 2 p.m.); Middle Atlantic Championship Tournament at Haverford on Saturday, Mar. 5.

WRESTLING—Mason-Dixon Championship Tournament at Gallaudet, on Friday and Saturday, Feb. 26 and 27; Middle Atlantic Championship Tournament at Lebanon Valley, on Friday and Saturday, Mar. 4 and 5.

LACROSSE—Johns Hopkins vs. MT. WASHINGTON on Saturday, Mar. 26 (Homewood at 2:30 p.m.); PRINCETON on Saturday, Apr. 9 (away); VIRGINIA on Saturday, Apr. 16 (Homewood at 2:30 p.m.); RUTGERS on Saturday, Apr. 23 (away); LOYOLA on Wednesday, Apr. 27 (Homewood at 3 p.m.); WASHINGTON AND LEE on Saturday, Apr. 30 (away); RENSSELAER POLYTECHNIC on Saturday, May 7 (Homewood at 2:30 p.m.); NAVY on Saturday, May 14 (away); MARYLAND on Saturday, May 21 (Homewood at 2:30 p.m.).

TENNIS—Johns Hopkins vs. BROWN on Tuesday, Apr. 5 (Homewood at 3:00 p.m.); TOWSON TEACHERS on Wednesday, Apr. 6 (away); RANDOLPH-MACON on Saturday, Apr. 9 (away); LOYOLA on Tuesday, Apr. 12 (Homewood at 3 p.m.); GETTYSBURG on Wednesday, Apr. 13 (Homewood at 3 p.m.); HAVERFORD on Saturday, Apr. 16 (away); DELAWARE on Tuesday, Apr. 19 (Homewood at 3 p.m.); CATHOLIC UNIVERSITY on Friday, Apr. 22 (away); WESTERN MARYLAND on Saturday, Apr. 23 (away); MARYLAND on Thursday, Apr. 28 (away); LOYOLA on Thursday, May 5 (away);

BASEBALL—Johns Hopkins vs. TOWSON TEACHERS on Wednesday, Apr. 6 (Homewood at 3 p.m.); LOYOLA on Thursday, Apr. 7 (away); HARVARD on Saturday, Apr. 9 (Homewood at 2 p.m.); WESTERN MARYLAND on Tuesday, Apr. 12 (Homewood at 3 p.m.); GETTYSBURG on Thursday, Apr. 14 (away); FRANKLIN AND MARSHALL on Thursday, Apr. 21 (Homewood at 3 p.m.); SWARTHMORE on Saturday, Apr. 23 (away); MARYLAND on Tuesday, Apr. 26 (Homewood at 3 p.m.); DELAWARE on Wednesday, Apr. 27 (Homewood at 3 p.m.); URSINUS on Saturday, Apr. 30 (Homewood at 2 p.m.); RANDOLPH-MACON on Saturday, May 4 (away); WASHINGTON on Saturday, May 7 (Homewood at 12 noon); LOYOLA on Tuesday, May 10 (Homewood at 3 p.m.); CATHOLIC UNIVERSITY on Friday, May 13 (away); WESTERN MARYLAND on Saturday, May 14 (away); DICKINSON on Wednesday, May 18 (away).

GOLF—Johns Hopkins vs. DARTMOUTH on Friday, Mar. 18 (Mt. Pleasant at 1:30 p.m.); COLGATE on Friday, Apr, 8 (Mt. Pleasant at 1:30 p.m.); GETTYSBURG on Wednesday, Apr. 13 (away); FRANKLIN AND MARSHALL on Tuesday, Apr. 19 (Mt. Pleasant at 1:30 p.m.); LOYOLA on Friday, Apr. 22 (Mt. Pleasant at 1:30 p.m.); WASHINGTON on Tuesday, Apr. 26 (Mt. Pleasant at 1:30 p.m.); JUNIATA on Friday, Apr. 29 (away); MARYLAND on Wednesday, May 4 (Mt. Pleasant at 1:30 p.m.); DELAWARE on Thursday, May 5 (away); WESTERN MARYLAND on Wednesday, May 11 (away); Mason-Dixon Championship Tournament on Monday, May 16 (Mt. Pleasant).

TRACK—Johns Hopkins vs. SWARTHMORE on Saturday, Apr. 9 (away); WESTERN MARYLAND on Saturday, Apr. 16 (Homewood at 12 noon); LOYOLA on Thursday, Apr. 21 (away); GETTYSBURG and ALBRIGHT on Tuesday, Apr. 26 (Homewood at 3:30 p.m.); DELAWARE on Tuesday, May 3 (Homewood at 3:30 p.m.); DICKINSON and URSINUS on Saturday, May 7 (away); Mason-Dixon Championship Tournament on Saturday, May 14 (Hampden-Sydney).

SPECIAL EVENTS

BUSINESS PROSPECTS IN LATIN AMERICA—A foreign affairs conference for corporation executives, sponsored by the Johns Hopkins School of Advanced International Studies and its affiliated Foreign Service Educational Foundation, will be devoted to a review of problems and opportunities facing American business in Latin America. (Tuesday and Wednesday, Apr. 5 and 6, at the Statler Hotel in Washington, D.C.; information and reservations may be obtained from the School of Advanced International Studies, 1906 Florida Ave., N.W., Washington, D. C.).

WILLIAMS LECTURE—James Van Allen, professor of physics at the University of Iowa, will deliver the 1960 George Huntington Williams Memorial Lecture, titled "Man's New Enterprise in Outer Space." (Friday, Mar. 25, at 5 p.m., in Shriver Hall.)

TELEVISION

JOHNS HOPKINS FILE 7—SUNDAY, FEB. 28 "New Look at the Universe," with Herbert Friedman, supervisor of the Atmospheric and Astrophysics Division of the Naval Research Laboratory; SUNDAY, MAR. 6, "Project Transit," a report on the navigational satellite being developed by the Applied Physics Laboratory, with Richard Kershner; SUNDAY, MAR. 13, "Unheard Melodies," with Donald H. Andrews, professor of chemistry; SUNDAY, MAR. 20, "Wound Shock," with Sanford Rosenthal and Kehle Markley of the National Institutes of Health; SUNDAY, MAR. 27, "Radiation Belt," with James Van Allen, professor of physics at the University of Iowa.

DRAMA

LE MISANTHROPE—The Amos Taylor, Jr., Memorial Fund, the Johns Hopkins Playshop, and the department of Romance languages will sponsor one performance, in French, of Molière's play. It will be directed by Bernard Dheran of the Comedie-Française and will star Jacques Dumesnil. (Sunday, Mar. 13, at 8:30 p.m., in Shriver Hall).

CANDIDA—The Johns Hopkins Playshop will present eight performances of George Bernard Shaw's *Candida*. (Thursday through Sunday, Mar. 31–Apr. 3 and Apr. 7–10, at 8:30 p.m., in the Playshop on the Homewood campus.)

EXHIBITIONS

SOUTH OF THE BORDER—The exhibition will consist of coins, maps, books, and other art objects dating from the days of the early conquest of Latin America to the present. Open to the public without charge. (Evergreen House, 4545 N. Charles St., from 2 to 5 p.m., Monday through Friday, through Mar. 16.)

ART EXHIBITION—The works of Selma Gross and Peggy Holloway will be displayed in the Medical Residence Hall, Broadway and McElderry Street, daily from 9 a.m. to 5 p.m., Mar. 6 through Mar. 31. Open to the public without charge.

SHERWOOD ROOM—The Johns Hopkins chapter of Alpha Phi Omega and the Goucher College Art Laboratory will sponsor an exhibition of paintings in the Sherwood Room, Levering Hall, daily from 9 a.m. to 5 p.m., through Mar. 6. Open to the public without charge.

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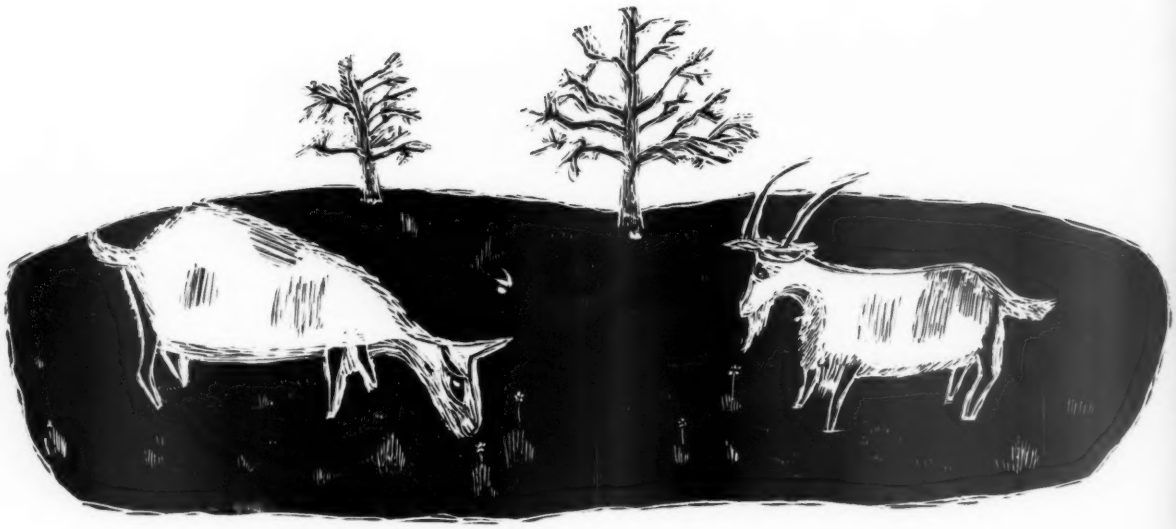

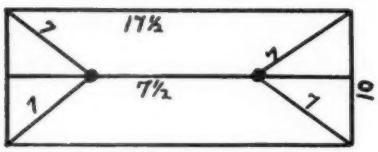

A farmer with two belligerent goats must devise a way for them to graze an entire meadow (10 × 17½ yards) without being able to fight. How can the goats be tethered to two poles with rings, 7½ yards apart and 7 yards from the nearest corners (see cut) so that they are separated but have access to all the grass? How much rope is needed for the job?

Two Goats

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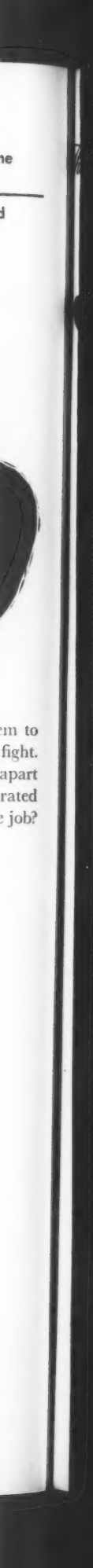
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